



DATE: January 9, 1984

TO: Rich Carlson

FROM: Bharat Mathur

SUBJECT: C.E. Raymond - Naperville

EPA Region 5 Records Ctr.



351280

This memo is to summarize some technical information concerning the trial burning of cyanide contaminated film chips at the C.E. Raymond facility in Naperville.

C.E. Raymond operates a test laboratory where waste and other materials are received in test quantities from various industries. A whole range of equipment is tested and design and operating parameters are established. Any material left over after testing is returned to the client. One such test unit is an incinerator.

The unit is a rotary kiln (18 inch diameter, 15 ft. length) with an afterburner, a precooler and a venturi scrubber. It is designed to operate at temperatures above 2000°F in the kiln and afterburner and up to 150% excess air.

The cyanide contaminated chips resulted when sodium cyanide solution was used to recover the silver content of the film.

A chemical analysis indicates the following:

Film Material - acetate-polyester
Cyanide Content - 100 to 500 ppm
Water Content - 10%
Heat Value - 8500 btu/lb.
Silver Content - 50 to 100 ppm

These chips will be delivered to C.E. Raymond in ten 55 gallon drums.

Based on C.E. Raymond's proposal prepared by the Radian Corporation, testing will be conducted within the following parameters.

Max Feed Rate of Chips	50 pounds per hour	
Max Feed Rate of Cyanide	0.5 pounds per hour	
<u>Test Temperatures °F</u>		
	<u>Kiln</u>	<u>Afterburner</u>
	2000°F	2200-2300°F
	1700	for all tests
	1300	

Operation of the incinerator shall immediately cease should stack concentrations of cyanide exceed 10 ppm. This is the limit which has been established by OSHA for a work place environment. At this concentration we estimate the ambient ground level concentration to be 0.01 ppm which according to published information is a concentration which would not be expected to cause any acute or chronic toxic effects.

This ambient concentration was estimated using the following stack parameters that will be maintained:

Gas Flow - 1200 CFM
Gas Temperature - 150°F

Physical stack parameters are:

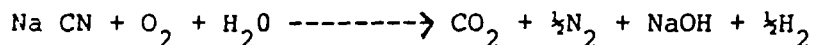
Diameter - 12 inches
Height - 30 feet

The plant boundary line is estimated at 150 ft. from this stack.

Testing will be discontinued if any of the following conditions are violated.

- a. The temperature shall be maintained greater than 1200°C (2200°F) at the exit of the secondary chamber.
- b. The rotary kiln and afterburner shall be maintained under negative pressure.
- c. Scrubbant pH shall be maintained greater than 9.
- d. The cyanide emitted through the exhaust stack shall be monitored continuously and not be allowed to exceed 10 ppm on a dry basis.
- e. The incineration process is to be preheated to operating temperature before introduction of the film chips.
- f. All control equipment is to be operational while feeding waste to the incinerator.

This test burn is necessary because there is limited well documented data on burning of cyanide contaminated material. It is, however, known that at high temperatures sodium cyanide will decompose into essentially carbon dioxide and nitrogen. The chemical reaction may be represented as follows:



As long as the conditions are not acidic, hydrogen cyanide which is the more reactive material, will not be formed. For this reason, the pH of the scrubber water will be maintained at a minimum of 9.0 which indicates a very alkaline solution.

In total, 2000 lbs of chips will be tested. Testing is limited to a maximum of 10 days. It is expected that actual testing will occur for 6 hours per day for a maximum of 6 days.

BM:dgc

cc: Roger Kanerva
Dan Goodwin
Mike Collins